

PRODUCT SAFETY DATA SHEET

SULFURIC ACID

A. GENERAL INFORMATION

TRADE NAME (COMMON NAME) SULFURIC ACID		<input checked="" type="checkbox"/> C.A.S. No.	<input type="checkbox"/> GENERAL PRODUCT CODE # 7664-93-9
CHEMICAL NAME AND/OR SYNONYM SULFURIC ACID Synonym: battery acid			
FORMULA H ₂ SO ₄ (Various Concentrations) in water		MOLECULAR WEIGHT 98.08	
ADDRESS (No., STREET, CITY, STATE AND ZIP CODE) General Chemical Corporation 90 East Halsey Road Parsippany, NJ 07054-0389			
CONTACT Manager of Product Safety	PHONE NUMBER (201) 515-1840	LAST ISSUE DATE May, 1990	CURRENT ISSUE DATE August, 1993

B. FIRST AID MEASURES

EMERGENCY PHONE NUMBER (800) 631-8050
<p>SKIN OR EYES: Immediately flush with plenty of water, continuing for at least 15 minutes. Remove contaminated clothing while washing. Continue flushing with water if medical attention is not immediately available.</p> <p>INGESTION: Do not induce vomiting. If conscious, give several glasses of milk (preferred) or water.</p> <p>INHALATION: Remove to fresh air. Observe for possible delayed reaction. If breathing has stopped, give artificial respiration. If breathing with difficulty, give oxygen, provided a qualified operator is available.</p> <p>GET IMMEDIATE MEDICAL ASSISTANCE for ingestion, inhalation, eye contact, irritation, or burns.</p>

C. HAZARDS INFORMATION

HEALTH

INHALATION Inhalation of fumes or acid mist can cause irritation or corrosive burns to the upper respiratory system, including nose, mouth, and throat. Lung irritation and pulmonary edema can also occur. LC ₅₀ (mist, animals): 20-60-mg/cu.m. — Ref. (a).	
INGESTION Can cause irritation and corrosive burns to mouth, throat, and stomach. Can be fatal if swallowed. Applicable to dilute solutions: LD ₅₀ (rat): 2140 mg/kg — Reference (b).	
SKIN Can cause severe burns.	
EYES Liquid contact can cause irritation, corneal burns, and conjunctivitis. Blindness may result, or severe or permanent injury. Mist contact may irritate or burn. Reference (b).	
PERMISSIBLE CONCENTRATION: AIR (SEE SECTION J)	BIOLOGICAL
TLV: same (ACGIH)	None.
1 mg/m ³ (as H ₂ SO ₄) (OSHA)	IDLH 80 mg/m ³

ND = NOT DETERMINED

NA = NOT APPLICABLE

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C. HAZARDS (Cont.)

UNUSUAL CHRONIC TOXICITY

Erosion of teeth, (2) lesions of the skin, (3) tracheo-bronchitis, (4) mouth inflammation, (5) conjunctivitis, (6) gastritis. Reference (a).

The International Agency for Research on Cancer (IARC) classified "strong inorganic acid mists containing sulfuric acid" as a Category 1 carcinogen, a substance that is "carcinogenic to humans". This classification is for inorganic acid mists only and does not apply to sulfuric acid or sulfuric acid solutions. The basis for the IARC classification rests on several epidemiology studies which have several deficiencies. These studies did not account for exposure to other substances, some known to be animal or potential human carcinogens, social influences (smoking or alcohol consumption) and included small numbers of subjects. Based on the overall weight of evidence from all human and chronic animal studies, no definitive causal relationship between sulfuric acid mist exposure and respiratory tract cancer has been shown.

FIRE AND EXPLOSION

FLASH POINT °C Not flammable <input type="checkbox"/> OPEN CUP <input type="checkbox"/> CLOSED CUP	AUTO IGNITION TEMPERATURE °C Not applicable	FLAMMABLE LIMITS IN AIR (% BY VOL.) LOWER - Not applicable UPPER - Not applicable
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UNUSUAL FIRE AND EXPLOSION HAZARDS

Flammable and potentially explosive hydrogen gas can be generated inside metal drums and storage tanks. Concentrated sulfuric acid can ignite combustible materials on contact.

D. PRECAUTIONS/PROCEDURES

FIRE EXTINGUISHING AGENTS RECOMMENDED

Involved in a fire, use water spray; avoid spraying water into containers. If only a small amount of combustibles is present, smother fire with dry chemical.

FIRE EXTINGUISHING AGENTS TO AVOID

Use water spray or other suitable agent for fires adjacent to non-leaking tanks or other containers of sulfuric acid.

SPECIAL FIRE FIGHTING PRECAUTIONS

Do not use solid water streams near ruptured tanks or spills of sulfuric acid. Acid reacts violently with water and can spatter acid onto personnel.

VENTILATION

Sufficient to reduce vapor and acid mists to permissible levels. Packaging and unloading areas and open processing equipment may require mechanical exhaust systems. Corrosion-proof construction recommended. Closed ventilation systems (e.g. vapor hoods) are frequently used in the electronics industry.

NORMAL HANDLING

Do not get in eyes, on skin, on clothing. Do not breathe vapor or mist. Use protective equipment outlined in Section E. Procedures are detailed in references listed in Section J. Do not add water to acid. When diluting, always add acid to water cautiously and with agitation. Use only with adequate ventilation.

STORAGE

Protect from physical damage. Store in a cool, well-ventilated area away from combustibles and reactive chemicals. Keep out of sun and away from heat. Keep containers upright. No smoking in storage area.

SPILL OR LEAK (ALWAYS WEAR PERSONAL PROTECTIVE EQUIPMENT — SECTION E)

Dilute small spills or leaks cautiously with plenty of water. Neutralize residue with alkali such as soda ash or lime. Adequate ventilation is required for soda ash due to release of CO₂ gas. (See Section I for disposal methods). No smoking in spill area. Major spills must be handled by a predetermined plan. Diking with soda ash is recommended. Consult References, Section J. Attempt to keep out of sewer. Any release to the environment of these products may be subject to Federal and/or state reporting requirements. Check with appropriate agencies.

SPECIAL PRECAUTIONS/PROCEDURES/LABEL INSTRUCTIONS

SIGNAL WORD - DANGER!

Loosen closures carefully. For carrying glass bottles, use rubber protective enclosures. If stored in metal containers, vapors can contain explosive hydrogen gas.

E. PERSONAL PROTECTIVE EQUIPMENT**1. HEAVY HANDLING:****Respiratory Protection**

Where required, use a respirator approved by NIOSH for sulfuric acid. If misting above 1 mg H_2SO_4 / wear: (a) gas mask with acid gas canister and also with high-efficiency particulate filter; (b) High efficiency particulate respirator; (c) Other choices, Reference (d).

Eyes and Face

As a minimum, wear hat, chemical safety goggles, and optionally full-face plastic shield. Do not wear contact lenses.

Hands, Arms, and Body

As a minimum, wear-resistant* apron, protective clothing, boots, and gloves for routine product use. For increased protection, include acid-resistant trousers and jacket.

2. SPECIALIZED HANDLING: (Only applicable when using the closed ventilation system mentioned on page 2):**Respiratory Protection**

Generally not required. For emergency, e.g. a misting situation, use a respirator approved by NIOSH for sulfuric acid. See above, "1. HEAVY HANDLING: Respiratory Protection".

Eyes and Face

As a minimum, safety glasses with nonperforated sideshields. Add a face shield if pouring liquid. For leak or spill or other emergency, use chemical safety goggles and optionally, full face shield. Do not wear contact lenses.

Hands, Arms, and Body

As a minimum, wear acid resistant apron and gloves*. For leak or spill or other emergency, use full protective clothing. See above, "1. HEAVY HANDLING: Hands, Arms, and Body".

* Preferably rubber.

F. PHYSICAL DATA

MATERIAL IS (AT NORMAL CONDITIONS): <input checked="" type="checkbox"/> LIQUID <input type="checkbox"/> SOLID <input type="checkbox"/> GAS <input type="checkbox"/>		APPEARANCE AND ODOR Oily, colorless to slightly yellow, clear to turbid liquid. Odorless.	
BOILING POINT For 94% Approx. 310°C	SPECIFIC GRAVITY ($\text{H}_2\text{O} = 1$) (liquid) 1.842	VAPOR DENSITY (AIR = 1) Not applicable.	
MELTING POINT Approx. -27°C			
SOLUBILITY IN WATER (% by Weight) Complete	pH 1% solution: pH = 0.9	VAPOR PRESSURE (mm Hg at 20°C) <input checked="" type="checkbox"/> (PSIG) <input type="checkbox"/> < 0.001	
EVAPORATION RATE (Butyl Acetate = 1) <input type="checkbox"/> (Ether = 1) <input type="checkbox"/> Not applicable.	% VOLATILES BY VOLUME (At 20°C) Not applicable.		

G. REACTIVITY DATA

STABILITY <input type="checkbox"/> UNSTABLE <input checked="" type="checkbox"/> STABLE	CONDITIONS TO AVOID Temperatures of 300 deg. C or higher: yields sulfur trioxide gas, which is toxic, corrosive, and an oxidizer.
INCOMPATIBILITY (MATERIALS TO AVOID) Nitro compounds, carbides, dienes, alcohols (when heated): cause explosions — Refs. (g, h). Oxidizing agents, such as chlorates and permanganates: cause fires and possibly explosions. Allyl compounds and aldehydes: undergo polymerization, possibly violent. — Ref. (g). Alkalies, amines, water, hydrated salts, carboxylic acid anhydrides, nitriles, olefinic organics, glycols, aqueous acids: cause strong exothermic reactions. — Refs. (g, h). Carbonates, cyanides, sulfides, sulfites, metals such as copper: yield toxic gases. — Ref. (h.) Also for metals, see hydrogen generation, Section C.	
HAZARDOUS DECOMPOSITION PRODUCTS Sulfur trioxide gas: see above. Also this is a fire risk if in contact with organic materials.	
HAZARDOUS POLYMERIZATION <input type="checkbox"/> MAY OCCUR <input checked="" type="checkbox"/> WILL NOT OCCUR	CONDITIONS TO AVOID NA

H. HAZARDOUS INGREDIENTS (Mixtures Only)

MATERIAL OR COMPONENT / C.A.S. #	WT. %	HAZARD DATA (SEE SECT. J)
NOT APPLICABLE		

I. ENVIRONMENTAL

DEGRADABILITY/AQUATIC TOXICITY		OCTANOL/WATER PARTITION COEFFICIENT	
Aquatic toxicity: 24.5 ppm/24 hr./bluegill/lethal/fresh water 42.5 ppm/48 hr./prawn/LC ₅₀ /salt water		ND	
EPA HAZARDOUS SUBSTANCES? (CLEAN WATER ACT SECT. 311)	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	IF SO, REPORTABLE QUANTITY: 1000 # (100% H ₂ SO ₄ basis)	40 CFR 116-117
WASTE DISPOSAL METHODS (DISPOSER MUST COMPLY WITH FEDERAL, STATE AND LOCAL DISPOSAL OR DISCHARGE LAWS)			
Treatment or disposal of waste generated by use of this product should be reviewed in terms of applicable federal, state and local laws and regulations. Users are advised to consult with appropriate regulatory agencies before discharge, treatment or disposal.			
RCRA STATUS OF UNUSED MATERIAL IF DISCARDED EPA Hazardous Waste		HAZARDOUS WASTE NUMBER: (IF APPLICABLE) No. D0002 (corrosive)	40 CFR 261.22

J. REFERENCES

PERMISSIBLE CONCENTRATION REFERENCES		
(1) OSHA Z-List; 29 CFR 1910.1000 (Revised 1989) (2) ACGIH 1993-94 List, "Threshold Limit Values for Chemical Substances..." Am. Conf. of Governmental Industrial Hygienists, Cincinnati 45202.		
REGULATORY STANDARDS	D.O.T. CLASSIFICATION: Corrosive material	49 CFR 173
D.O.T. Hazardous Materials Table 49 CFR 172.101		DOT ID Number: UN 1830
GENERAL		
(a) Documentation of the Threshold Limit Values, 4th Edition, 1981, Am. Conf. of Governmental Hygienists, Cincinnati 45202. (b) NIOSH, Registry of Toxic Effects of Chemical Substances, 1982-83, Accession #WS 556 00 000, PB81-154478, Nat. Tech. Info. Service, Springfield, VA 22161. (c) "Criteria for a Recommended Standard...Occupational Exposure to Sulfuric Acid", NIOSH U.S. Dept of HHS, 1974, PB233098, Nat. Tech. Info. Service, Springfield, VA 22161. (d) NIOSH/OSHA, "Pocket Guide to Chemical Hazards...", September, 1985. (e) "NIOSH/OSHA — Occupational Health Guidelines for Chemical Hazards — Sulfuric", 1978. (f) Allied Chemical Technical Service Report for storage and handling procedures. (g) NFPA Manual 491M, "Manual of Hazardous Chemical Reactions, 1987 Nat. Fire Protection Assoc., Boston 02210. (h) Bretherick, L., Handbook of Reactive Chemical Hazards, 3rd Ed., 1985 Butterworths, Boston.		

K. ADDITIONAL INFORMATION

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